

PATENT APPLICATION No. 10/661,466  
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Amendments to the Claims

Claims

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- 1 1. (Original): A quantum information processing platform comprising,  
2 a plurality of quantum information processing elements each having,  
3 a cage defining a cavity formed from a plurality of self-assembling protein molecules,  
4 and one or more cargo elements located within the cavity, wherein  
5 at least one of the cargo elements comprises a qubit programmable into a plurality of  
6 logical states.
- 1 2. (Original): A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing elements comprise,  
3 receptors for capturing and positioning the one or more cargo elements within the cavity.
- 1 3. (Original): A quantum information processing platform according to claim 2, wherein  
2 the quantum information processing elements comprise,  
3 a vesicle located within the cage and enclosing the one or more cargo elements, wherein  
4 the receptors extend through the vesicle to capture and position the cargo element within the  
5 vesicle.
- 1 4. (Original): A quantum information processing platform according to claim 3, wherein the  
2 quantum information processing elements comprise,  
3 adaptors disposed between the receptors and the cage and binding to the receptors.
- 1 5. (Original): A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing elements comprise,  
3 a vesicle located within the cage and enclosing one or more cargo elements.
- 1 6. (Original): A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing elements comprise,  
3 molecular tethers for capturing and positioning one or more cargo elements within the  
4 cavity.
- 1 7. (Original): A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing elements comprise,  
3 direct cage bonding for capturing and positioning one or more cargo elements within the  
4 cavity.

- 1 8. (New:) A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing elements comprise,  
3 a functionalized cage for attaching one or more elements externally to the cage.
- 1 9. (Original): A quantum information processing platform according to claim 1, wherein the  
2 quantum information processing element comprise, receptors, molecular tethers and direct cage  
3 bonding for capturing and positioning one or more cargo elements within the cavity.
- 1 10. (Original): A quantum information processing platform according to claim 1, wherein the  
2 one or more cargo elements of a subset of the quantum information processing elements further  
3 comprises a non-permeable cavity.
- 1 11. (Original): A quantum information processing platform according to claim 3, wherein the  
2 one or more vesicles of a subset of the quantum information processing elements further  
3 comprises a non-permeable cavity.
- 1 12. (Original): A quantum information processing platform according to claim 1, wherein  
2 the cage is electrically neutral and inhibits charge transfer between the cage and its cargo  
3 elements.
- 1 13. (Original): A quantum information processing platform according to claim 1, wherein  
2 the cage reduces the tendency of a plurality of logical states in a coherent state to collapse into a  
3 decoherent state.
- 1 14. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage inhibits non-quantum information processing cargo elements from interfering with qubit  
3 cargo element operation in other cages.
- 1 15. (Original): A quantum information processing platform according to claim 3, wherein the  
2 vesicle is electrically neutral and inhibits charge transfer between the vesicle and its enclosed  
3 cargo elements.
- 1 16. (Original): A quantum information processing platform according to claim 3, wherein the  
2 vesicle is insulative and reduces the tendency of a plurality of logical states in a coherent state to  
3 collapse into a decoherent state.
- 1 17. (Original): A quantum information processing platform according to claim 4, wherein the  
2 receptors and adaptors are electrically neutral and inhibit charge transfer between the vesicle and  
3 cage and their cargo elements.

1 18. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage reduces contaminant background radiation to cargo carried within the cage.

1 19. (Original): A quantum information processing platform according to claim 3, wherein the  
2 vesicle reduces contaminant background radiation to cargo carried within the vesicle.

1 20. (Original): A quantum information processing platform according to claim 1, comprising  
2 a self-assembling framework of cages to structurally support one or more of the self-assembling  
3 quantum information processing elements.

1 21. (Original): A quantum information processing platform according to claim 1, comprising  
2 a self-assembling electrically neutral substrate of cages to structurally support one or more of the  
3 self-assembling quantum information processing elements.

1 22. (Original): A quantum information processing platform according to claim 1, comprising  
2 a self-assembling framework of cages to structurally order one or more self-aligning ones of the  
3 quantum information processing elements.

1 23. (Original): A quantum information processing platform according to claim 1, wherein  
2 the one or more cargo elements of a subset of the quantum information processing elements is a  
3 single cargo element comprising a qubit programmable into a plurality of logical states.

1 24. (Original): A quantum information processing platform according to claim 1, wherein the  
2 one or more cargo elements of a subset of the quantum information processing elements are a  
3 plurality of cargo elements.

1 25. (Original): A quantum information processing platform according to claim 23, wherein  
2 the plurality of cargo elements are qubits programmable into a plurality of logical states.

1 26. (Original): A quantum information processing platform according to claim 23, wherein at  
2 least some of the plurality of cargo elements are non-quantum information processing cargo  
3 elements.

1 27. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein the one or more cargo elements of a subset of the quantum information processing  
3 elements respond to stimuli internal and or external to the cage.

1 28. (Currently amended): A quantum information processing platform according to claim 3,  
2 wherein the one or more vesicles of a subset of the quantum information processing elements  
3 respond to stimuli internal and or external to the vesicle.

- 1 29. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein the one or more quantum information processing elements and their qubit and non-QIP  
3 cargo are used in vitro and or in vivo.
- 1 30. (Currently amended): A quantum information processing platform according to claim 23,  
2 wherein a subset of the non-quantum information processing cargo elements include one or more  
3 therapeutic single task and or multitask in vivo and or in vitro agents.
- 1 31. (Withdrawn):
- 1 32. (Withdrawn):
- 1 33. (Withdrawn):
- 1 34. (Original): A quantum information processing platform according to claim 23, wherein a  
2 subset of the qubit and non-quantum information processing cargo elements include one or more  
3 quantum dots.
- 1 35. (Original): A quantum information processing platform according to claim 23, wherein a  
2 subset of the qubit and non-quantum information processing cargo elements include one or more  
3 photonic dots.
- 1 36. (Original): A quantum information processing platform according to claim 23, wherein a  
2 subset of the cargo elements include one or more liquids without dopants or with one or more  
3 dopants of any type.
- 1 37. (Original): A quantum information processing platform according to claim 23, wherein a  
2 subset of the qubit and non-quantum information processing cargo elements include a gas or  
3 vapor without dopants or with one or more dopants of any type.
- 1 38. (Original): A quantum information processing platform according to claim 1, wherein the  
2 at least one qubit of a subset of the plurality of quantum information processing elements are  
3 programmed by one or more pulses of electromagnetic radiation.
- 1 39. (Withdrawn):
- 1 40. (Withdrawn):
- 1 41. (Withdrawn):
- 1 42. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein ~~the~~ at least one qubit of a subset of the quantum information processing elements  
3 ~~includes an unpaired electron~~ and the plurality of logical states of the qubit are defined by one or  
4 more electron spin polarization properties and or attributes.

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1 43. (Withdrawn):

1 44. (Withdrawn):

1 45. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein ~~the~~ at least one qubit of a subset of the quantum information processing elements  
3 includes a ~~nitroxide molecule~~ one or more species of molecules.

1 46. (Withdrawn):

1 47. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein ~~the~~ at least one qubit of a subset of the quantum information processing elements  
3 includes a qubit that is photon-based and the plurality of logical states of the photon-based qubit  
4 includes a coherent logical state.

1 48. (Original): A quantum information processing platform according to claim 1, wherein the  
2 plurality of logical states includes a coherent state.

1 49. (Original): A quantum information processing platform according to claim 1, wherein the  
2 plurality of logical states includes a coherent state at room temperature.

1 50. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage bioengineered in whole or in part.

1 51. (Original): A quantum information processing platform according to claim 1, wherein the  
2 self-assembling protein molecule is a clathrin molecule

1 52. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage comprises self-assembling synthetic protein molecules.

1 53. (Currently amended): A quantum information processing platform according to claim 4,  
2 wherein receptors, adaptors, and vesicle comprise natural and or synthetic protein molecules.

1 54. (Original): A quantum information processing platform according to claim 4, wherein the  
2 receptors, adaptors, and vesicle are bioengineered in whole or in part.

1 55. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein at least a portion of the cage is ~~metal-coated~~ in one or more materials.

1 56. (Currently amended): A quantum information processing platform according to claim 4,  
2 wherein at least a portion of the receptors, adaptors, and vesicle is ~~metal~~ coated in one or more  
3 materials.

1 57. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage is substantially greater than one nanometer in diameter.

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1 58. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage is at least about 50 nanometers in diameter.

1 59. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage is at least about 100 nanometers in diameter.

1 60. (Original): A quantum information processing platform according to claim 1, wherein the  
2 cage is symmetric with respect to a plane.

1 61. (Original): A quantum information processing platform element according to claim 1,  
2 wherein the cage has icosahedral geometry.

1 62. (Original): A quantum information processing platform according to claim 1, wherein at  
2 least one of the plurality of cages includes a plurality of qubits and a subset of the plurality of  
3 qubits are linearly positioned at vertices along a single plane using circulant ordering.

1 63. (Original): A quantum information processing platform according to claim 1, wherein a  
2 subset of the quantum information processing elements are physically linked together.

1 64. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein a subset of the quantum information processing elements are functionally linked  
3 together, ~~either~~-locally and or at a distance.

1 65. (Original): A quantum information processing element according to claim 1, comprising  
2 an encoder for programming the at least one qubit of a subset of the quantum processing  
3 elements.

1 66. (Original): A quantum information processing element according to claim 1 comprising,  
2 a decoder for reading information out of the at least one qubit of a subset of the quantum  
3 processing elements.

1 67. (Currently amended): A quantum information processing platform according to claim 1,  
2 wherein a subset of the quantum information processing elements form a hybrid system upon  
3 their physical and or functional integration with non-invention elements in vitro and or in vivo.

1 68. (Original): A method for a quantum information processing platform comprising,  
2 providing one or more quantum information processing elements, each quantum  
3 information processing element comprising

4 a cage defining a cavity formed from a plurality of self-assembling protein molecules,  
5 and

6 one or more cargo elements located within the cavity, wherein,

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- 7           at least one of the cargo elements comprises a qubit programmable into a plurality of  
8 logical states;  
9           programming the one or more quantum information processing elements using an  
10 encoder; and  
11           reading information from the one or more quantum information processing elements  
12 using a decoder.